WHAT IS CLAIMED IS:

1. A method of inhibiting growth of ice crystals, comprising

identifying a material requiring inhibition of growth of ice crystals, and

applying to the material, in an amount effective for inhibiting ice crystal growth on or in said material, one or more ice-controlling materials selected from the group consisting of 1,2-cyclohexanediol, 1,3-cyclohexanedione, 1,4-cyclohexanedione, 1,2-cyclohexandione, 1,4-cyclohexanedimethanol, a mixture of 1,4-cyclohexanediol with one or more of 1,3,5-cyclohexanetriol, 1,3-cyclohexanediol, 1,2-cyclohexanediol, 1,3-cyclohexanedione, 1,4-cyclohexanedione, 1,2-cyclohexandione and 1,4-cyclohexanedimethanol, charged derivatives of the ice-controlling materials that include one or more charged moieties therein, and polymers including one or more of the ice-controlling materials in the chain thereof.

2. The method according to claim 1, wherein the ice-controlling material is a mixture of 1,4-cyclohexanediol and 1,3-cyclohexanediol.

3. The method according to claim 1, wherein the ice-controlling material is a polymer including one or more of the ice-controlling materials in the chain thereof, the ice-controlling materials being present in the chain in an amount effective to inhibit ice crystal growth.

4. The method according to claim 1, wherein the ice-controlling material is a charged derivative of the ice-controlling materials that include one or more charged moieties in the molecules thereof.

5. The method according to claim 1, wherein the material is selected from the group consisting of an ice crystal whose growth is to be prevented, a material within a pipeline, a food product, a living plant, a vehicle surface, a road surface, a walkway, footwear, a light transmitter, a manufactured snow crystal, and a utility line.

6. The method according to claim 5, wherein the material is a gas within a gas pipeline.

7. The method according to claim 5, wherein the food product is a citrus crop or frozen food.

8. The method according to claim 5, wherein the vehicle surface is a windshield or an airplane wing.

9. The method according to claim 1, wherein the material is an organ, body fluid or other body tissue that is to be cooled for cryopreservation.

10. A method of inhibiting growth of ice crystals during cryopreservation of a living system, comprising bringing the living system into contact with a cryopreservation composition containing one or more ice-controlling materials selected from the group consisting of 1,2-cyclohexanediol, 1,3-cyclohexanedione, 1,4-cyclohexanedione, 1,2-cyclohexandione, 1,4-cyclohexanedimethanol, a mixture of 1,4-cyclohexanediol with one or more of 1,3,5-cyclohexanetriol, 1,3-cyclohexanediol, 1,2-cyclohexanediol, 1,3-cyclohexanedione, 1,4-cyclohexanedione, 1,2-cyclohexandione and 1,4-cyclohexanedimethanol, charged derivatives of the ice-controlling materials that include one or more charged moieties therein, and polymers including one or more of the ice-controlling materials in the chain thereof, and

subsequently reducing the temperature of the living system to a cryopreservation temperature.

11. The method according to claim 10, wherein the ice-controlling material is present in the cryopreservation composition in an amount of from 0.05 to 2.0 M.

12. The method according to claim 11, wherein the cryopreservation composition further contains at least one additional cryoprotectant compound.

13. The method according to claim 12, wherein the at least one additional cryoprotectant compound is selected from the group consisting of including acetamide, agarose, alginate, l-analine, albumin, ammonium acetate, butanediol, chondroitin sulfate, chloroform, choline, dextrans, diethylene glycol, dimethyl acetamide, dimethyl formamide, dimethyl sulfoxide (DMSO), erythritol, ethanol, ethylene glycol, formamide, glucose, glycerol, α-glycerophosphate, glycerol monoacetate, glycine, hydroxyethyl starch, inositol, lactose, magnesium chloride, magnesium sulfate, maltose, mannitol, mannose, methanol, methyl acetamide, methylformamide, methyl ureas, phenol, pluronic polyols, polyethylene glycol, polyvinylpyrrolidone, proline, propylene glycol, pyridine N-oxide, ribose, serine, sodium bromide, sodium chloride, sodium iodide, sodium nitrate, sodium sulfate, sorbitol, sucrose, trehalose, triethylene glycol, trimethylamine acetate, urea, valine and xylose.

14. The method according to claim 10, wherein the cryopreservation composition further contains at least one anti-freeze protein.

15. A cryopreservation composition comprising at least one ice-controlling material selected from the group consisting of 1,2-cyclohexanediol, 1,3-

cyclohexanedione, 1,4-cyclohexanedione, 1,2-cyclohexandione, 1,4-cyclohexanedimethanol, a mixture of 1,4-cyclohexanediol with one or more of 1,3,5-cyclohexanetriol, 1,3-cyclohexanediol, 1,2-cyclohexanediol, 1,3-cyclohexanedione, 1,4-cyclohexanedione, 1,2-cyclohexandione and 1,4-cyclohexanedimethanol, charged derivatives of the ice-controlling materials that include one or more charged moieties therein, and polymers including one or more of the ice-controlling materials in the chain thereof.

16. The cryopreservation composition according to claim 15, wherein the ice-controlling material is present in the cryopreservation composition in an amount of from 0.05 to 2.0 M.

17. The cryopreservation composition according to claim 15, wherein the at cryopreservation composition further comprises at least one additional cryoprotectant compound selected from the group consisting of acetamide, agarose, alginate, l-analine, albumin, ammonium acetate, butanediol, chondroitin sulfate, chloroform, choline, dextrans, diethylene glycol, dimethyl acetamide, dimethyl formamide, dimethyl sulfoxide (DMSO), erythritol, ethanol, ethylene glycol, formamide, glucose, glycerol, α-glycerophosphate, glycerol monoacetate, glycine, hydroxyethyl starch, inositol, lactose, magnesium chloride, magnesium sulfate, maltose, mannitol, mannose, methanol, methyl acetamide, methylformamide, methyl ureas, phenol, pluronic polyols, polyethylene glycol, polyvinylpyrrolidone, proline, propylene glycol, pyridine N-oxide, ribose, serine, sodium bromide, sodium chloride, sodium iodide, sodium nitrate, sodium sulfate, sorbitol, sucrose, trehalose, triethylene glycol, trimethylamine acetate, urea, valine and xylose.

18. The cryopreservation composition according to claim 15, wherein the cryopreservation composition further contains at least one anti-freeze protein.

19. A method of inhibiting growth of ice crystals within a pipeline carrying a material therethrough, comprising introducing into the pipeline one or more ice-controlling materials selected from the group consisting of 1,3,5-cyclohexanetriol, 1,3-cyclohexanediol, 1,2-cyclohexanediol, 1,3-cyclohexanedione, 1,4-cyclohexanedione, 1,2-cyclohexandione, 1,4-cyclohexanedimethanol, a mixture of 1,4-cyclohexanediol with one or more of 1,3,5-cyclohexanetriol, 1,3-cyclohexanediol, 1,2-cyclohexanediol, 1,3-cyclohexanedione, 1,4-cyclohexanedione, 1,2-cyclohexandione and 1,4-cyclohexanedimethanol, charged derivatives of the ice-controlling materials that include

one or more charged moieties therein, and polymers including one or more of the ice-controlling materials in the chain thereof.

20. The method according to claim 19, wherein the material is a gas or oil.